**WE CLAIM:**

1. A catheter system comprising:

(a) a guide wire;

(b) a catheter having an outer side wall, a proximal end and distal end and including:

(i) a first passageway through which the guide wire can be slideably moved between a first possession and a second position;

(ii) a second passageway spaced apart from said first passageway, said second passageway having a proximal end and a distal end;

(c) guidance means for guiding travel of said guide wire, said guidance means comprising:

(i) energy transmission means; received within said second passageway, said energy transmission means having a first end and a second end, said second end being located proximate said distal end of said second passageway;

(ii) a source of energy operably associated with said energy transmission means for directing energy toward the said energy transmission means;

(iii) detector means operably associated with said energy transmission means for receiving a signal from said energy transmission means;

(iv) electronic means operably associated with said detector means for analyzing said signal and for generating a signal tracing; and

(v) display means operably associated with said electronic means for displaying said signal tracing.

2. The catheter system as defined in claim 1 in which said outer side wall of said catheter is provided with an opening in communication with said first passageway for receiving said guide wire there through.

3. The catheter system as defined in claim 1 in which said catheter has an axial centerline and in which said first passageway is aligned with said axial centerline.

4. The catheter system as defined in claim 1 in which said catheter has an axial centerline and in which said second passageway is aligned with said axial centerline.

5. The catheter system as defined in claim 1 in which said source of energy comprises a low coherence light source.

6. The catheter system as defined in claim 1 in which said source of energy comprises a radio frequency transmitter.

7. A catheter system comprising:

(a) a guide wire;

(b) a catheter having an outer side wall, a proximal end and distal end and including:

(i) a first passageway through which the guide wire can be slideably moved between a first position and a second position;

(ii) a second passageway spaced apart from said first passageway, said second passageway having a proximal end and a distal end;

(c) an optical fiber received within said second passageway, said optical fiber having a first end and a second end, said second end being located proximate said distal end of said second passageway;

(d) illumination means operably associated with said optical fiber for directing light toward the said optical fiber;

(e) reflecting means disposed proximate said optical fiber for reflecting light from said optical fiber;

(f) a fiber optic coupler operably associated with said optical fiber for receiving light reflected in from said optical fiber and for generating a signal in response thereto;

(g) a detector operably interconnected with said coupler for receiving said signal from said fiber optic coupler;

(h) electronic means operably associated with said detector for analyzing said signal and for generating a signal tracing; and

(i) display means operably associated with said electronic means for displaying said signal tracing.

8. The catheter system as defined in claim 7 in which said outer side wall of said catheter is provided with an opening in communication with said first passageway for receiving said guide wire therethrough.

9. The catheter system as defined in claim 7 in which said catheter has an axial centerline and in which said first passageway is aligned with said axial centerline.

10. The catheter system as defined in claim 7 in which said catheter has an axial centerline and in which said second passageway is aligned with said axial centerline.

11. The catheter system as defined in claim 7 in which said illumination means comprises a low coherence light source.

12. The catheter system as defined in claim 7 in which said reflecting means comprises a mirror.

13. A catheter system comprising:

(a) a guide wire;

(b) a catheter having an outer side wall having an opening therein, a proximal end and distal end and including:

(i) a first passageway through which the guide wire can be slideably moved between a first position and a second position, said first passageway being in communication with said opening in said outer side wall of said catheter;

(ii) a second passageway spaced apart from said first passageway, said second passageway having a proximal end and a distal end;

(c) an optical fiber received within said second passageway, said optical fiber having a first end and a second end, said second end being located proximate said distal end of said second passageway.

(d) illumination means operably associated with said optical fiber for directing light toward the said optical fiber, said illumination means comprising a low coherence light source;

(e) reflecting means disposed proximate said optical fiber for reflecting light from said optical fiber, said reflecting means comprising a mirror;

(f) a fiber optic coupler operably associated with said optical fiber for receiving light reflected in from said optical fiber and for generating a signal in response thereto;

(g) a detector operably interconnected with said coupler for receiving said signal from said fiber optic coupler;

(h) electronic means operably associated with said detector for analyzing said signal and for generating a signal tracing; and

(i) display means operably associated with said electronic means for displaying with signal tracing.

14. The catheter system is defined in claim 13 in which said guidewire comprises a steerable metal guide wire having a diameter of approximately 0.014 inches.

15. The catheter system as defined in claim 13 in which said catheter has an axial center line and in which said first and second passageways are radially offset from said axial centerline.

16. A method for opening occlusions in an artery passageway using a catheter system comprising a steerable guide wire having first and second ends, a

catheter having a distal end and a proximal end and a first passageway through which the guidewire can be slideably moved, a second passageway spaced apart from said first passageway, and an optical coherence reflectometry system including an optical fiber received within said passageway, said method comprising the steps of:

(a) inserting the guidewire into the occluded artery to a position where said second end thereof resides within the occlusion;

(b) inserting the first end of the guidewire into the first passageway of the catheter and sliding the catheter over the guidewire to a position where and the distal end of the guidewire resides within the occlusion;

(c) using the optical coherence reflectometry verifying that the catheter is not approaching the wall of the artery;

(d) advancing the second end of the guidewire into the occlusion;

(e) using the optical coherence reflectometry verifying that the catheter is not approaching the wall of the artery; and

(f) further advancing the second end of the guidewire into the occlusion.

17. The method as defined in claim 16, including the further steps of sequentially advancing the second end of the guidewire into the inclusion until the occlusion is opened and as the guidewire is advanced periodically using the optical

coherence reflectometry to verify that the catheter is not approaching the wall of the artery.

18. A method for opening occlusions in an artery passageway using a catheter system comprising a steerable guidewire having first and second ends, a catheter having a distal end and a proximal end, a side wall having an opening therein and a first passageway through which the guidewire can be slideably moved, said first passageway being in communication with said opening in said side wall of said catheter, the catheter further having a second passageway spaced apart from said first passageway, and an optical coherence reflectometry system including an optical fiver received within sid second passageway, said method comprising the steps of:

(a) inserting the guidewire into the occluded artery to a position where said second end thereof resides within the occlusion;

(b) inserting the first end of the guidewire into the first passageway of the catheter via the opening of a side wall of the catheter and sliding the catheter over the guidewire to a position where and the distal end of the guidewire resides within the occlusion;

(c) using the optical coherence reflectometry verifying that the catheter is not approaching the wall of the artery;

(d) advancing the second end of the guidewire into the occlusion;

(e) using the optical coherence reflectometry verifying that the catheter is not approaching the wall of the artery; and

(f) further advancing the second end of the guidewire into occlusion.

19. The method as defined in claim 18 including the further steps of sequentially advancing the second end of the guidewire into the inclusion until the occlusion is opening and as the guidewire is advanced periodically using the optical coherence reflectometry to verify that the catheter is not approaching the wall of the artery.

20. The method as defined in claim 19 including the further stop of removing the guidewire and the catheter from the artery.